

REMARKS

The above amendment is believed to correct typographical errors in the specification and place the claims in proper condition for examination. Early and favorable action is awaited.

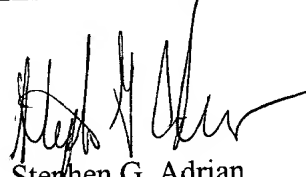
Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "Version with markings to show changes made."

In the event there are any additional fees required, please charge our Deposit Account No.

01-2340.

Respectfully submitted,

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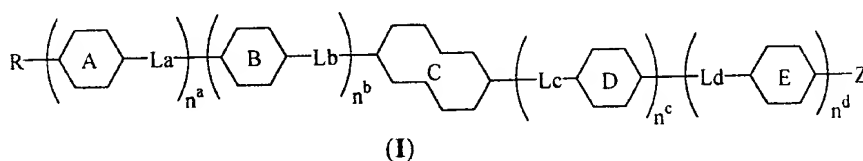
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VERSION WITH MARKINGS TO SHOW CHANGES MADE

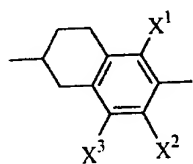
The paragraph beginning at page 5, line 14, and ending at page 6, line 12, has been amended as follows:

Invention 1: A tetrahydronaphthalene derivative represented by a general formula (I)

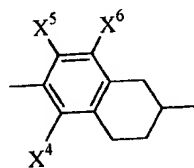


(wherein, R represents a saturated or unsaturated alkyl group or alkoxyl group of 1 to 20 carbon atoms which may incorporate a branched chain and may be substituted with 1 to 7 fluorine atoms or alkoxyl groups of 1 to 7 carbon atoms; the linkage groups La, Lb, Lc and Ld each represent independently a single bond, $-\text{CH}_2\text{CH}_2-$, $-\text{CH}=\text{CH}-$, $-\text{CH}(\text{CH}_3)\text{CH}_2-$, $-\text{CH}_2\text{CH}(\text{CH}_3)-$, $-\text{CH}(\text{CH}_3)\text{CH}(\text{CH}_3)-$, $-\text{CF}_2\text{CF}_2-$, $-\text{CF}=\text{CF}-$, $-\text{CH}_2\text{O}-$, $-\text{OCH}_2-$, $-\text{OCH}(\text{CH}_3)-$, $-\text{CH}(\text{CH}_3)\text{O}-$, $-\text{C}^{\circ}\text{C}$, CF_2O , OCF_2 , COO , OCO , COS or SCO ; Z represents a fluorine atom, chlorine atom, cyano group, cyanato group, trifluoromethoxy group or a difluoromethoxy group; ring A, ring B and ring D each represent independently a trans-1,4-cyclohexylene group, trans-decahydronaphthalene-2,6-diyl group, trans-1,3-dioxane-2,4-diyl group, or a 1,4-phenylene group which may be substituted with one or two fluorine atoms, pyridine-2,5-diyl group, pyrimidine-2,5-diyl group, pyrazine-2,5-diyl group, a pyridazine-3,6-diyl group, and a naphthalene-2,6-diyl group which may be substituted with one or two fluorine atoms; ring E represents independently a 1,4-phenylene group which may be

substituted with one or two fluorine atoms, and a naphthalene-2,6-diyl group which may be substituted with one or two fluorine atoms; ring C represents either the general formula (IIa) or the general formula (IIb)



(IIa)



(IIb)

(wherein, X¹, X², X³, X⁴, X⁵ and X⁶ each represent independently a hydrogen atom or a fluorine atom); and n^a, n^b, n^c and n^d each represent independently either 0 or 1.

The paragraph beginning at page 9, line 18, has been amended as follows:

Invention 22: A tetrahydronaphthalene derivative according to any one of Inventions 1 through 21 which forms a nematic phase.

The paragraph beginning at page 10, line 4, has been amended as follows:

Invention 27: An active matrix driven liquid crystal display element utilizing a liquid crystal composition according to Invention ~~26~~ 25.

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group, 3-fluoropropyl group, 2-fluoropropyl group, 1-fluoropropyl group, 3,3-difluoropropyl group, 3,3,3-trifluoropropyl group, 2,2,3,3-tetrafluoropropyl group, 2,2,3,3,3-pentafluoropropyl group, 1,1,2,2,3,3,3-heptafluoropropyl group, 4-fluorobutyl group, 3-fluorobutyl group, 2-fluorobutyl group, 1-fluorobutyl group, 4,4-difluorobutyl group, 4,4,4-trifluorobutyl group, 3,3,4,4-tetrafluorobutyl group, 3,3,4,4,4-pentafluorobutyl group, 2,2,3,3,4,4,4-heptafluorobutyl group, 5-fluoropentyl group, 4-fluoropentyl group, 3-fluoropentyl group, 2-fluoropentyl group, 1-fluoropentyl group, 5,5-difluoropentyl group, 5,5,5-trifluoropentyl group, 4,4,5,5-tetrafluoropentyl group, 4,4,5,5,5-pentafluoropentyl group, 3,3,4,4,5,5,5-heptafluoropentyl group, 6-fluorohexyl group, 5-fluorohexyl group, 4-fluorohexyl group, 3-fluorohexyl group, 2-fluorohexyl group, 1-fluorohexyl group, 6,6-difluorohexyl group, 6,6,6-trifluorohexyl group, 5,5,6,6,6-pentafluorohexyl group, 4,4,5,5,6,6,6-heptafluorohexyl group, 7-fluoroheptyl group, 6-fluoroheptyl group, 5-fluoroheptyl group, 4-fluoroheptyl group, 3-fluoroheptyl group, 2-fluoroheptyl group, 1-fluoroheptyl group, 7,7-difluoroheptyl group, 7,7,7-trifluoroheptyl group, 6,6,7,7-tetrafluoroheptyl group, 6,6,7,7,7-pentafluoroheptyl group, 5,5,6,6,7,7,7-heptafluoroheptyl group, 8-fluorooctyl group, 7-fluorooctyl group, 6-fluorooctyl group, 5-fluorooctyl group, 4-fluorooctyl group, 3-fluorooctyl group, 2-fluorooctyl group, 1-fluorooctyl group, 8,8-difluorooctyl group, 8,8,8-trifluorooctyl group, 7,7,8,8-tetrafluorooctyl group, 7,7,8,8,8-pentafluorooctyl group and a 6,6,7,7,8,8,8-heptafluorooctyl group; fluorine substituted unsaturated alkyl groups such as a 2,2-difluoroethenyl group, (E)-1,2-difluoroethenyl group, (Z)-1,2-difluoroethenyl group, 3,3-difluoro-2-propenyl group, (E)-2,3-difluoro-2-propenyl group, (Z)-2,3-difluoro-2-propenyl group, 4,4-difluoro-3-butenyl group, (E)-3,4-difluoro-3-butenyl group, (Z)-3,4-difluoro-3-butenyl group, 5,5-difluoro-4-pentenyl group, (E)-4,5-

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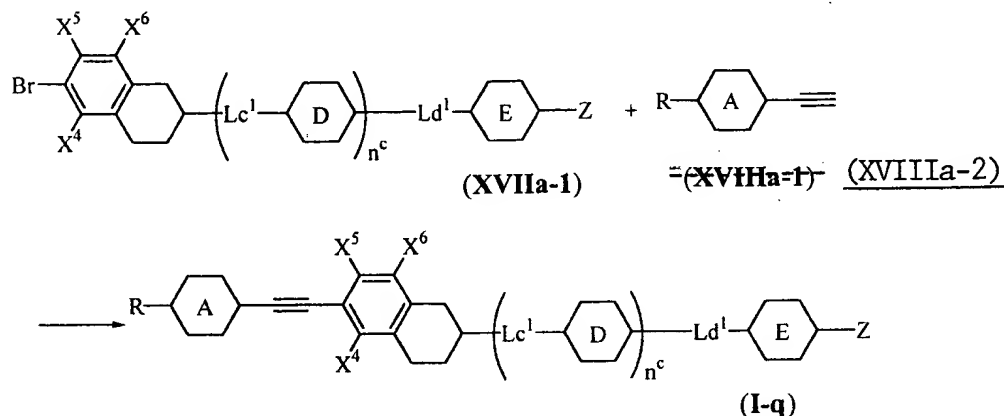
difluoro-4-pentenyl group, (Z)-4,5-difluoro-4-pentenyl group, 6,6-difluoro-5-hexenyl group, (E)-5,6-difluoro-5-hexenyl group, (Z)-5,6-difluoro-5-hexenyl group, (E)-1,2-difluoro-1-propenyl group, (E)-1,2-difluoro-1-butenyl group, (E)-1,2-difluoro-1-pentenyl group, (E)-1,2-difluoro-1-hexenyl group, (Z)-1-fluoro-1-propenyl group, (Z)-1-fluoro-1-butenyl group, (Z)-1-fluoro-1-pentenyl group, (Z)-1-fluoro-1-hexenyl group, (Z)-2-fluoro-1-propenyl group, (Z)-2-fluoro-1-butenyl group, (Z)-2-fluoro-1-pentenyl group, (Z)-2-fluoro-1-hexenyl group, (E)-2,3-difluoro-2-butenyl group, (E)-2,3-difluoro-2-pentenyl group, (E)-2,3-difluoro-2-hexenyl group, (Z)-2-fluoro-2-butenyl group, (Z)-2-fluoro-2-pentenyl group, (Z)-2-fluoro-2-hexenyl group, (Z)-3-fluoro-2-butenyl group, (Z)-3-fluoro-2-pentenyl group and a (Z)-3-fluoro-2-hexenyl group; alkoxyl group substituted alkyl groups such as a methoxymethyl group, ethoxymethyl group, propoxymethyl group, butoxymethyl group, pentyloxymethyl group, hexyloxymethyl group, heptyloxymethyl group, 1-methoxyethyl group, 1-ethoxyethyl group, 1-propoxyethyl group, 1-butoxyethyl group, 1-pentyloxyethyl group, 1-hexyloxyethyl group, 1-heptyloxyethyl group, 2-methoxyethyl group, 2-ethoxyethyl group, 2-propoxyethyl group, 2-butoxyethyl group, 2-pentyloxyethyl group, 2-hexyloxyethyl group, 2-heptyloxyethyl group, 1-methoxypropyl group, 1-ethoxypropyl group, 1-propoxypropyl group, 1-butoxypropyl group, 1-pentyloxypropyl group, 1-hexyloxypropyl group, 1-heptyloxypropyl group, 2-methoxypropyl group, 2-ethoxypropyl group, 2-propoxypropyl group, 2-butoxypropyl group, 2-pentyloxypropyl group, 2-hexyloxypropyl group, 2-heptyloxypropyl group, 3-methoxypropyl group, 3-ethoxypropyl group, 3-propoxypropyl group, 3-butoxypropyl group, 3-pentyloxypropyl group, 3-hexyloxypropyl group, 3-heptyloxypropyl group, 4-methoxybutyl group, 4-ethoxybutyl group, 4-propoxybutyl group, 4-butoxybutyl group, 4-pentyloxybutyl group, 4-hexyloxybutyl group, 4-

heptyloxybutyl group, 5-methoxypentyl group, 5-ethoxypentyl group, 5-propoxypentyl group, 5-butoxypentyl group, 5-pentyloxypentyl group, 5-hexyloxypentyl group, 5-heptyloxypentyl group, 6-methoxyhexyl group, 6-ethoxyhexyl group, 6-propoxyhexyl group, 6-butoxyhexyl group, 6-pentyloxyhexyl group, 6-hexyloxyhexyl group and a 6-heptyloxyhexyl group; and the alkoxyl groups thereof, although alkyl groups are preferred. Of such alkyl groups, straight chain saturated alkyl groups and unsaturated alkyl groups are preferred, and particularly desirable groups include a methyl group, ethyl group, propyl group, butyl group, pentyl group, hexyl group, heptyl group, octyl group, vinyl group, trans-1-propenyl group, 2-propenyl group, trans-1-butenyl group, trans-2-butenyl group, 3-butenyl group, trans-1-pentenyl group, trans-2-pentenyl group, trans-3-pentenyl group, 4-pentenyl group, trans-1-hexenyl group, trans-2-hexenyl group, trans-3-hexenyl group, trans-4-hexenyl group, 5-hexenyl group, trans-1-heptenyl group, trans-2-heptenyl group, trans-3-heptenyl group, trans-4-heptenyl group, trans-5-heptenyl group, and a 6-heptenyl group.

The paragraph beginning at page 108, line 5, has been amended as follows:

The lithium or magnesium reagent represented by the general formula (~~VIa-1~~) (VIa-1) is a compound frequently used in liquid crystal production, and can be easily produced from the corresponding halide or the like.

The paragraph beginning at page 124, line 1, has been amended as follows:



(wherein, R, X⁴, X⁵, X⁶, the ring A, the ring D, the ring E and Z have the same meaning as described above for the general formula (I), and Lc¹ and Ld¹ represent a single bond or a CH₂CH₂-.)

The paragraph beginning at page 153, line 13, has been amended as follows:

A mixture of 50 g of the 2-propyl-1,2,3,4-tetrahydronaphthalen-6-yl trifluoromethanesulfonate obtained in (7-2), 33.9 g of 2-(3,4,5-trifluorophenyl)acetylene, 3.6 g of tetrakis(triphenylphosphine) palladium(0), and 51.4 g of potassium phosphate in 200 ml of DMF was stirred for 10 hours at 80°C. The mixture was subsequently cooled to room temperature, water was added, the mixture was extracted with toluene, and the organic layer was washed subsequently with water and a saturated aqueous solution of sodium chloride, and subsequently dried over anhydrous sodium sulfate. The crude product obtained by removal of the solvent by evaporation was purified by silica gel column chromatography (hexane) and then recrystallized 3 times from ethanol to obtain 32.6 g of 2-propyl-6-(3,4,5-trifluorophenyl)ethynyl-1,2,3,4-tetrahydronaphthalene.

The paragraph beginning at page 160, line 14, has been amended as follows:

Consequently, addition of 20% of the compound (~~I-2~~) (I-1-2) enabled the fall in the nematic phase upper limit temperature (T_{N-I}) to be limited to 44°C, while the threshold voltage (V_{th}) could be reduced by 0.37 V. In addition, the increase in the response time could be suppressed to 8 ms. Furthermore, even after standing for 1 week at 0°C, crystal precipitation did not occur. Moreover, when the composition was crystallized by rapid cooling and the melting point (T_{C-N}) was then measured, it was found to be 13°C, which is almost the same as the host liquid crystal (H), indicating that the compound (I-1-2) dissolves readily in the host liquid crystal.

The paragraph beginning at page 162, line 11, has been amended as follows:

Next, a liquid crystal element was prepared by using the composition (~~M-1~~) (M-3) to fill a TN cell with a cell thickness of 6.0 μm , and measurement of the electrooptical characteristics of the element revealed the values shown below.

The paragraph beginning at page 162, line 17, has been amended as follows:

Consequently, addition of 20% of the compound (I-3-2) enabled the fall in the nematic phase upper limit temperature (T_{N-I}) to be limited to 46°C, while the threshold voltage (V_{th}) could be reduced by 0.33 V. In addition, the increase in the response time could be suppressed to 9 ms. Furthermore, even after standing for 1 week at 0°C, crystal precipitation did not occur. Moreover, when the composition was crystallized by rapid cooling and the melting point (T_{C-N}) was then

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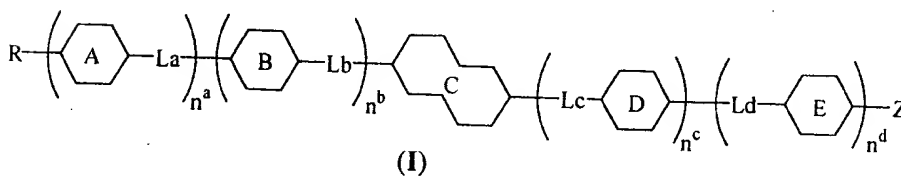
measured, it was found to be 12°C, which is almost the same as the host liquid crystal (H), indicating that the compound (~~I-2~~) (I-3-2) dissolves readily in the host liquid crystal.

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IN THE CLAIMS:

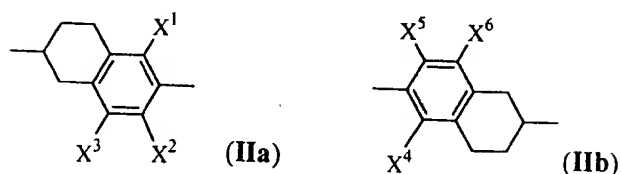
Please amend the following claims as follows:

1. (Amended) A tetrahydronaphthalene derivative represented by a general formula (I)



(wherein, R represents a saturated or unsaturated alkyl group or alkoxyl group of 1 to 20 carbon atoms which may incorporate a branched chain and may be substituted with 1 to 7 fluorine atoms or alkoxyl groups of 1 to 7 carbon atoms; linkage groups La, Lb, Lc and Ld each represent independently a single bond, $-\text{CH}_2\text{CH}_2-$, $-\text{CH}=\text{CH}-$, $-\text{CH}(\text{CH}_3)\text{CH}_2-$, $-\text{CH}_2\text{CH}(\text{CH}_3)-$, $-\text{CH}(\text{CH}_3)\text{CH}(\text{CH}_3)-$, CF_2CF_2 , $\text{CF}=\text{CF}$, CH_2O , OCH_2 , $\text{OCH}(\text{CH}_3)$, $\text{CH}(\text{CH}_3)\text{O}$, C°C , CF_2O , OCF_2 , COO , OCO , COS or SCO ; Z represents a fluorine atom, chlorine atom, cyano group, cyanato group, trifluoromethoxy group or a difluoromethoxy group; ring A, ring B and ring D each represent independently a trans-1,4-cyclohexylene group, a trans-decahydronaphthalene-2,6-diyl group, a trans-1,3-dioxane-2,4-diyl group, or a 1,4-phenylene group which may be substituted with one or two fluorine atoms, a pyridine-2,5-diyl group, a pyrimidine-2,5-diyl group, a pyrazine-2,5-diyl group, a pyridazine-3,6-diyl group, and a naphthalene-2,6-diyl group which may be substituted with one or two fluorine atoms; ring E represents independently a 1,4-phenylene group which may be substituted with one or two fluorine atoms, and a naphthalene-2,6-diyl group which may be

substituted with one or two fluorine atoms, ring C represents either one of a general formula (IIa) and a general formula (IIb)



(wherein, X^1 , X^2 , X^3 , X^4 , X^5 and X^6 each represent independently a hydrogen atom or a fluorine atom); and n^a , n^b , n^c and n^d each represent independently either 0 or 1;

although, in a case in which $n^c = 1$ and $n^d = 0$, ring D represents a 1,4-phenylene group which may be substituted with one or two fluorine atoms and/or a naphthalene-2,6-diyl group which may be substituted with one or two fluorine atoms;

in a case in which Z is a cyano group, R is an unsubstituted and saturated alkyl group or alkoxyl group, $n^a = n^c = n^d = 0$ and $n^b = 1$, or $n^b = n^c = n^d = 0$ and $n^a = 1$, ring A and ring B are 1,4-phenylene groups, La and Lb are single bonds, and ring C is said general formula (IIa), then at least one of X^1 , X^2 and X^3 represents a fluorine atom;

in a case in which Z is a cyano group, R is an unsubstituted and saturated alkyl group or alkoxyl group, $n^a = n^b = n^c = 0$ and $n^d = 1$, or $n^a = n^b = n^d = 0$ and $n^c = 1$, ring C and ring D are 1,4-phenylene groups, Lc and Ld are single bonds or -COO- linkages, and ring C is said general formula (IIa), then at least one of X^1 , X^2 and X^3 represents a fluorine atom;

in a case in which Z is a cyano group, R is an unsubstituted and saturated alkyl group or alkoxyl group, $n^a = n^b = n^c = 0$ and $n^d = 1$, or $n^a = n^b = n^d = 0$ and $n^c = 1$, ring C and ring D are 1,4-

phenylene groups, Lc and Ld are single bonds or -COO- linkages, and ring C is said general formula (IIb), then at least one of X^4 , X^5 and X^6 represents a fluorine atom;

in a case in which Z is a fluorine atom, R is an unsubstituted and saturated alkyl group or alkoxyl group, $n^a = n^b = n^c = 0$ and $n^d = 1$, or $n^a = n^b = n^d = 0$ and $n^c = 1$, ring C and ring D are 1,4-phenylene groups, Lc and Ld are -COO- linkages, and ring C is said general formula (IIb), then at least one of X^4 , X^5 and X^6 represents a fluorine atom;

and in a case in which ring C is said general formula (IIb), at least one of n^c and n^d is 1).

4. (Amended) A tetrahydronaphthalene derivative according to ~~any one of claims 1 through 3~~ claim 1, wherein in said general formula (I), either one of n^a and n^b is 0.

5. (Amended) A tetrahydronaphthalene derivative according to ~~any one of claims 1 through 4~~ claim 1, wherein in said general formula (I), either one of n^c and n^d is 0.

6. (Amended) A tetrahydronaphthalene derivative according to ~~any one of claims 1 through 5~~ claim 1, wherein in said general formula (I), $n^a = n^b = 0$.

7. (Amended) A tetrahydronaphthalene derivative according to ~~any one of claims 1, 2, 4 and 5~~ claim 1, wherein in said general formula (I), $n^c = n^d = 0$.

8. (Amended) A tetrahydronaphthalene derivative according to ~~any one of claims 1 through 7~~ claim 1, wherein in said general formula (I), at least one of n^a , n^b , n^c and n^d is 1.

9. (Amended) A tetrahydronaphthalene derivative according to ~~any one of claims 1 through 8~~ claim 1, wherein in said general formula (I), said linkage groups La, Lb, Lc and Ld are each selected independently from a group consisting of a single bond, $-\text{CH}_2\text{CH}_2-$, and $-\text{C}^\circ\text{C}$.

10. (Amended) A tetrahydronaphthalene derivative according to ~~any one of claims 1 through 9~~ claim 1, wherein in said general formula (I), said linkage groups La, Lb, Lc and Ld are each selected independently from a group consisting of a single bond and CH_2CH_2 .

11. (Amended) A tetrahydronaphthalene derivative according to ~~any one of claims 1 through 10~~ claim 1, wherein in said general formula (I), said linkage groups La, Lb, Lc and Ld are each a single bond.

12. (Amended) A tetrahydronaphthalene derivative according to ~~any one of claims 1 through 11~~ claim 1, wherein in said general formula (I), ring A, ring B and ring D are each independently selected from a group consisting of a trans-1,4-cyclohexylene group, a trans-decahydronaphthalene-2,6-diyl group, a trans-1,3-dioxane-2,4-diyl group, a 1,4-phenylene group which may be substituted with one or two fluorine atoms, and a naphthalene-2,6-diyl group which may be substituted with one or two fluorine atoms.

13. (Amended) A tetrahydronaphthalene derivative according to ~~any one of claims 1 through 12~~ claim 1, wherein in said general formula (I), Z is a fluorine atom.

14. (Amended) A tetrahydronaphthalene derivative according to ~~any one of claims 1 through 12~~ claim 1, wherein in said general formula (I), Z is a cyano group.

15. (Amended) A tetrahydronaphthalene derivative according to ~~any one of claims 1 through 12~~ claim 1, wherein in said general formula (I), Z is a trifluoromethoxy group.

16. (Amended) A tetrahydronaphthalene derivative according to ~~any one of claims 1 through 15~~ claim 1, wherein in said general formula (I), R is a saturated or unsaturated alkyl group of 1 to 20 carbon atoms which may incorporate a branched chain and may be substituted with 1 to 7 fluorine atoms or alkoxyl groups of 1 to 7 carbon atoms.

17. (Amended) A tetrahydronaphthalene derivative according to ~~any one of claims 1 through 16~~ claim 1, wherein in said general formula (I), R is a saturated or unsaturated straight chain alkyl group of 1 to 20 carbon atoms.

18. (Amended) A tetrahydronaphthalene derivative according to ~~any one of claims 1 through 17~~ claim 1, wherein in said general formula (I), X^3 , X^4 and X^5 in said formula (IIa) and said formula (IIb) are hydrogen atoms.

19. (Amended) A tetrahydronaphthalene derivative according to ~~any one of claims 1 through 18~~ claim 1, wherein in said general formula (I), X^2 in said formula (IIa) is a hydrogen atom and X^1 is a fluorine atom.

20. (Amended) A tetrahydronaphthalene derivative according to ~~any one of claims 1 through 18~~ claim 1, wherein in said general formula (I), X^1 in said formula (IIa) is a hydrogen atom and X^2 is a fluorine atom.

21. (Amended) A tetrahydronaphthalene derivative according to ~~any one of claims 1 through 20~~ claim 1 which shows liquid crystallinity.

22. (Amended) A tetrahydronaphthalene derivative according to ~~any one of claims 1 through 21~~ claim 1 which shows a nematic phase.

23. (Amended) A tetrahydronaphthalene derivative according to ~~any one of claims 1 through 22~~ claim 1 which upon addition to a nematic liquid crystal composition shows a nematic phase.

27. (Amended) An active matrix driven liquid crystal display element utilizing a liquid crystal composition according to claim ~~26~~ 25.